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March 11, 2021

Director, Voting System Testing & Certification
U.S. Election Assistance Commission
633 3rd Street NW, Suite 200
Washington, DC 20001

Re: Hart ECO-01461 - Correct Paging File Setting Procedure on Verity 2.5 Devices

Dear Mr. Lovato,

Hart has requested that SLI Compliance review ECO-01461 and supporting documentation to determine if the proposed update can be considered de minimis.

Summary Description:

This ECO modifies the device Operating System procedure to create the pagefile.sys file on devices in Verity Voting 2.5 after the Unified Write Filter (UWF) is applied. Hart determined that the paging file settings were removed by the Windows 10 UWF during the device security hardening processes.

Updated device CFast cards are created to account for the updated procedure and the Device OS Creation and Configuration Process Document for Verity 2.5 (4005675) is updated to move the pagefile.sys creation until after UWF is enabled to account for Windows 10 behavior.

There is no change to Verity 2.5 software.

Reference Documents:

- EAC 2005 Voluntary Voting System Guidelines (VVSG) Volume II, Sec. 1 & 4
- EAC Voting System Testing and Certification Program Manual V. 2, Sec. 3.4 & 3.5

Documentation used in SLI's Assessment:

- ECO-01461 Summary - Correct Paging File Setting Procedure on Verity 2.5 Devices
4005689 A00
- 4005689A_Supporting_Documents

- TDP Update:
 - Device OS Creation and Configuration Process Document Verity 2.5 4005675 A00 vs A01
- Device Hash Manifests:
 - Captured Following ECO-01461 Change
 - Comparisons
- QA Test Report:
 - ECO-01461 QA Test Report for Verity 2.5 with paging file enabled on Devices 4005690 A00

Conclusion:

Verity Voting 2.5 paging file settings must be consistent with prior releases of Verity. Verity's software system limit controls are dependent on the paging file being present.

The Verity Voting 2.5 modification included the transition from a Windows 7 (Windows Embedded Standard 7) to a Windows 10 (Windows 10 Enterprise 2019 LTSC) based Operating System.

A notable difference between Windows 7 and Windows 10 is regarding the behavior when the Write Filter is enabled, a feature Verity utilizes in its defense model to enable immutability.

Hart followed its documented process, the Verity Device OS Creation and Configuration document, to perform OS configuration, product installs, and security hardening on devices for Verity 2.5. This document describes the creation of pagefile.sys file during the creation of the configured base OS, prior to Verity software installs and security hardening. Hart's quality audits found that the pagefile.sys file was missing on Verity 2.5 devices. Hart determined that UWF used on Windows 10 deletes all paging file settings upon activation, a behavior that differs from the analogous feature, Enhanced Write Filter (EWF), on Windows 7. The documented process must be updated due to this change in behavior, and the paging file must be enabled on all Verity 2.5 device images.

SLI Compliance has reviewed the submitted documentation from Hart. This included a review of the change to Device OS Creation and Configuration Process Document Verity 2.5 4005675 A01, internal QA testing performed by Hart, and hash files generated during Hart QA testing.

SLI Compliance performed additional analysis. This included setting up the devices, verifying the hash files for each device CFast are equivalent to the currently certified versions as well as the files generated by Hart during their internal QA testing, verifying the addition of pagefile.sys to the CFast, and exercising the functionality of the system with a General and Open Primary election for regression testing purposes. All testing passed with no issues or anomalies observed.

As required under section 3.4.3 of the EAC's Voting System Testing and Certification Program Manual Version 2.0, and in accordance with the instruction provided in *NOC 19-01: Software De Minimis Changes*, SLI Compliance considers the nature of ECO-01461 to be De Minimis and therefore not to affect the Federal certification status for the Verity 2.5 voting system.

If you have questions regarding this assessment, please contact Jon Panek.

Sincerely,

A handwritten signature in blue ink, appearing to read "Traci Mapps". The signature is fluid and cursive, with the first name "Traci" being more prominent than the last name "Mapps".

Traci Mapps
Director